

**WHAT IS CLAIMED IS:**

1           1. An isolated UCP2 polypeptide, said UCP2 polypeptide comprising at  
2 least 164 consecutive amino acid residues of the amino acid sequence set forth in SEQ. ID.  
3 NO: 1, said consecutive amino acid residues comprising an alanine at amino acid residue 55  
4 and a threonine at amino acid residue 219 of SEQ. ID. NO: 1.

1           2. The isolated UCP2 polypeptide in accordance with claim 1, wherein  
2 said UCP2 polypeptide has the amino acid sequence set forth in SEQ. ID. NO: 1.

1           3. The isolated UCP2 polypeptide in accordance with claim 1, wherein  
2 said UCP2 polypeptide is encoded by the nucleic acid sequence set forth in SEQ. ID. NO: 2.

1           4. An isolated nucleic acid that encodes a UCP2 polypeptide, wherein the  
2 codon for amino acid residue 55 (Ala) is a member selected from the group consisting of  
3 GCT, GCC, GCA and GCG, and the codon for amino acid residue 219 (Thr) is a member  
4 selected from the group consisting of ACT, ACC, ACA and ACG.

1           5. The isolated nucleic acid that encodes a UCP2 polypeptide in  
2 accordance with claim 4, wherein said codon for amino acid residue 55 is GCC.

1           6. The isolated nucleic acid that encodes a UCP2 polypeptide in  
2 accordance with claim 4, wherein said codon for amino acid residue 219 is ACT.

1           7. The isolated nucleic acid that encodes a UCP2 polypeptide in  
2 accordance with claim 4, wherein said UCP2 polypeptide has the amino acid sequence set  
3 forth in SEQ. ID. NO: 1.

1           8. The isolated nucleic acid that encodes a UCP2 polypeptide in  
2 accordance with claim 4, wherein said nucleic acid has the nucleic acid sequence set forth in  
3 SEQ. ID. NO: 2.

1                   9. An isolated nucleic acid that encodes the UCP2 polypeptide of claim 1,  
2 wherein a codon for amino acid residue 55 (Ala) is a member selected from the group  
3 consisting of GCT, GCC, GCA and GCG, and a codon for amino acid residue 219 (Thr) is a  
4 member selected from the group consisting of ACT, ACC, ACA and ACG.

1                   10. An isolated nucleic acid that encodes a UCP2 polypeptide in accordance  
2 with claim 4, wherein said nucleic acid is operably linked to a promoter.

1                   11. An isolated nucleic acid that encodes a UCP2 polypeptide in accordance  
2 with claim 10, wherein said nucleic acid is contained in an expression vector.

1                   12. An expression vector containing the nucleic acid of claim 4 in operative  
2 association with a regulatory element that controls expression of the nucleic acid in a host  
3 cell.

1                   13. A cell comprising a recombinant nucleic acid in accordance with claim  
2 4.

1                   14. A cell in accordance with claim 13, wherein said recombinant nucleic  
2 acid is in operative association with a regulatory element that controls the expression of the  
3 nucleic acid in a host cell.

1                   15. A method of making a UCP2 polypeptide, said method comprising:  
2                   introducing a nucleic acid of claim 4 into a host cell or cellular extract;  
3                   incubating said host cell or cellular extract under conditions such that  
4                   said UCP2 polypeptide is expressed in said host cell or cellular extract; and  
5                   recovering said UCP2 polypeptide from said host cell or cellular extract.

1                   16. A method for diagnosing body weight disorders, said method  
2 comprising detecting in a patient sample, the level of:

- a. an mRNA transcribed from a nucleic acid encoding a UCP2 polypeptide having the amino acid sequence set forth in SEQ. ID. NO: 1;
- b. a UCP2 polypeptide having the amino acid sequence set forth in SEQ. ID. NO: 1; or
- c. a UCP2 polypeptide encoded by the nucleic acid sequence set forth in SEQ. ID. NO: 2.

17. The method in accordance with claim 16, wherein the level is induced in overweight individuals.

18. The method in accordance with claim 16, wherein the level is repressed in overweight individuals.

19. The method in accordance with claim 16, wherein the level is induced in underweight individuals.

20. The method in accordance with claim 16, wherein the level is repressed in underweight individuals.

21. A method of treating obesity in a mammal, said method comprising administering to said mammal a therapeutically effective amount of a UCP2 polypeptide and a pharmaceutically acceptable carrier.

22. A method of identifying a modulator of UCP2 gene expression, said method comprising:

providing a cell comprising a UCP2 promoter operably linked to a reporter gene;

contacting said cell with a test compound that is a potential modulator of UCP2 gene expression; and

detecting the expression level of the reporter gene, wherein an increase or decrease in reporter gene expression in the presence of the test compound compared to

9 reporter gene expression in the absence of the test compound indicates that the test  
10 compound is a modulator of UCP2 gene expression.

1                           23. The method according to claim 22, wherein the test compound causes  
2 an increase in reporter gene expression.